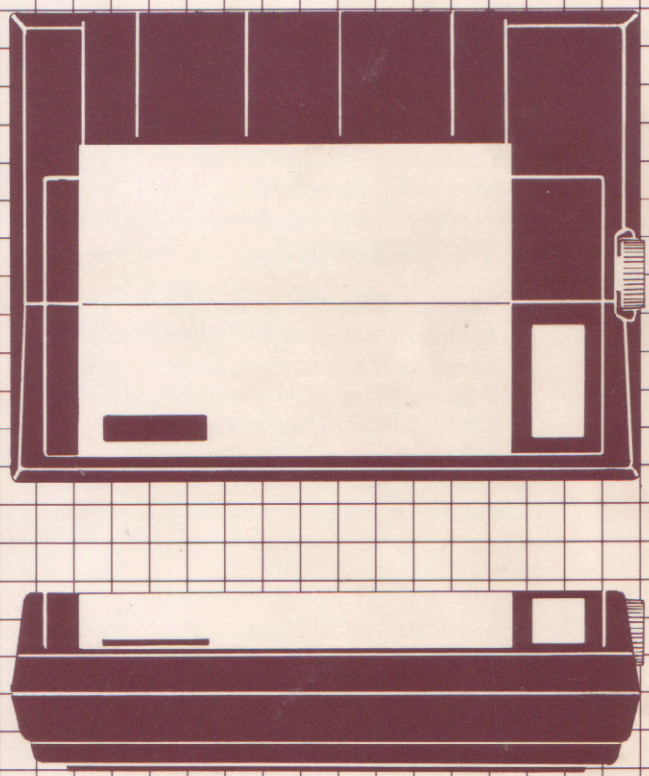
OWNER'S MANUAL

GP-550A

GP Graphic Printer

SEIKOSHA



SEIKOSHA CO.,LTD.
SYSTEM EQUIPMENT DIVISION

WARNING:
"This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only computers certified to comply with the Class B limits may be attached to this printer. Operation with noncertified computers is likely to result in interference to radio and TV reception."

"This equipment generates and uses radio frequency and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate the computer with respect to the receiver
- Move the computer away from the receiver
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems."

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

INTRODUCTION

Congratulations on your purchase of the SEIKOSHA GP-550A GRAPHIC PRINTER. This Printer is a high-density dot-matrix printer with a unique two-hammer system which can perform a variety of different printing operations. Be sure to read this Owner's Manual carefully in order to use the Printer to its fullest.

Main Features

- Various character fonts — Standard, Condensed, Correspondence, Italic Cursive, Superscript/ Subscript, and Proportional characters.
- Graphics — standard and high-resolution.
- Underline capability.
- Minimum linefeed is 1/120 inch.
- Tractor feed and friction feed are standard.
- The ink ribbon cassette has an inker that can be replaced as the ink is used up.
- Automatic printing takes place when the buffer becomes full.
- Self test printing is standard to provide self diagnosis.

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[1] GENERAL SPECIFICATIONS

1. Printing specifications

(1) Printing method — Impact type dot matrix
(SEIKOSHA's unique 2-hammer method)

(2) Character sets

	CHAR. SETS	COMPOSITION H×V DOTS	SPACE DOTS	CHAR / INCH	CHAR / LINE	PRINT SPEED	NO. OF CHARS
1 PASS	Standard Pica	9×8	3	10	80	50cps	139
	Standard pica Elongated	18×8	6	5	40	25	139
	Standard Elite	9×8	1	12	96	60	139
	Standard Elite Elongated	18×8	2	6	48	30	139
	Condensed	5×8	2	17	136	86	139
	Condensed Elongated	10×8	4	8.5	68	43	139
2 PASS	Correspondence Pica	9×16	3	10	80	25	139
	Correspondence Pica Elongated	18×16	6	5	40	12	139
	Correspondence Elite	9×16	1	12	96	30	139
	Correspondence Elite Elongated	18×16	2	6	48	15	139
	Italic Cursive	12×16	0	10	80	25	139
	Italic Cursive Elongated	24×16	0	5	40	12	139
	Super Script	5×8	2	17	136	43	139
	Super Script Elongated	10×8	4	8.5	68	21	139
	Sub Script	5×8	2	17	136	43	139
	Sub Script Elongated	10×8	4	8.5	68	21	139
	Proportional	n×16	–	–	–	–	139
	Proportional Elongated	2n×16	–	–	–	–	139

(3) Graphics

Arbitrary combinations of 8 vertical dots

Arbitrary combinations of 16 vertical dots

(4) Dot density

Horizontal 1/120″ (0.21mm)

Vertical 1/120″ (0.21mm)

(5) Printing direction

Unidirectional (left to right)

a. 1-pass printing:

Standard, Standard elite, Condensed and 8-dot graphics

b. 2-pass printing:

Correspondence, Correspondence elite, Italic cursive, Super/subscript, Proportional and 16-dot graphics

(6) Line spacing

1/6″, 1/8″, 2/15″, 1/12″ and N/120″ (N=0~99)

(7) Multiple copies

Original plus one copy (45Kg + 35Kg paper)

(8) Intermixing printing

Intermixing text and graphics on the same line is allowed

2. Paper feed specifications

(1) Paper feed direction

Forward direction only

(2) Paper feed method

Pin feed..... maximum 10 inch width paper

Friction feed

(3) Minimum line feed amount

1/120″

(4) Line feed speed

10 lines/sec (1/6″ line feed pitch)

3. Paper specifications

(1) Paper width

4.5~10 inches for pin feed paper

Tractor width is adjustable.

(2) Paper thickness and weight recommended

0.07mm (2.8 mils)

45~55Kg in Japan or 15~18 pounds in USA

(3) Paper Type

Continuous form paper

Single sheet paper

4. Ink ribbon specifications

Special single color cassette type.

5. Operating environment

(1) Power supply

120, 220/240 VAC ± 10%, 50/60Hz

(2) Power consumption

30 watts (printing characters)

11 watts (stand by)

(3) Temperature

5°C~40°C

(4) Humidity

20%~80% (no condensation)

(5) External dimensions

420W×113H×305Dmm

(6) Weight

5.5Kg

[2] DESCRIPTION OF THE GP-550A

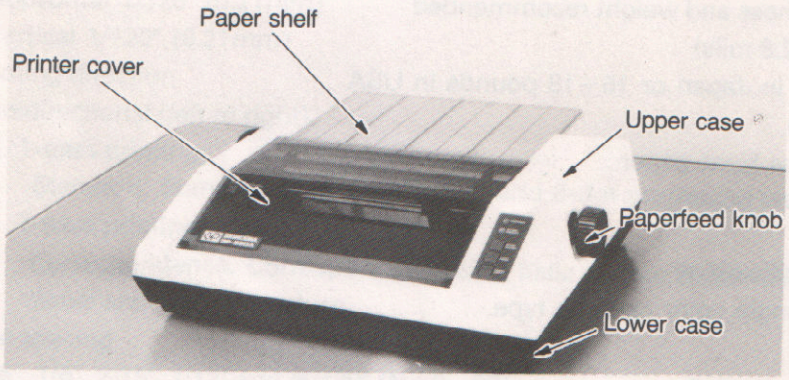


Figure 2-1 Front View

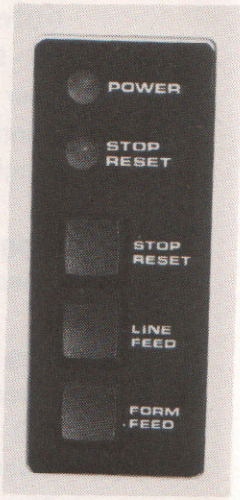


Figure 2-4 Switches and indicators

Be sure to remove the black plastic tube from the carriage guide before applying power.

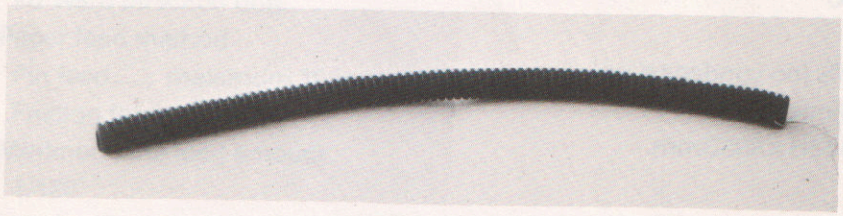


Figure 2-2 Black plastic tube

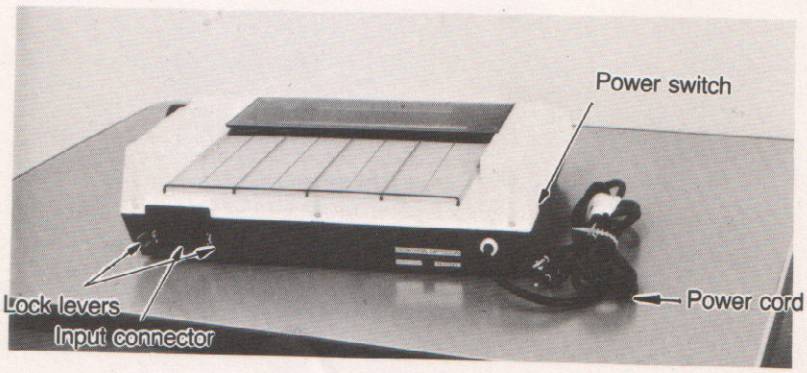


Figure 2-3 Rear view

1. Power switch

The power switch is located on the left of the printer.

2. STOP/RESET switch

(1) Pushing the switch causes the printer to stop, or if stopped, it clears the STOP condition.

(2) In the STOP condition, the STOP/RESET lamp is on, the P. EMP signal is output, and printing is temporarily stopped. The LINE FEED switch and the FORM FEED switch are both invalid during this condition.

3. LINE FEED switch

(1) A 1/6 inch line feed is executed each time it is pushed.

(2) If held down, line feeds are continuously executed.

(3) Line feeds are performed even when paper is out.

4. FORM FEED switch

(1) Pressing this switch causes a formfeed to be executed to the top of the next page.

(2) A formfeed is conducted regardless of paper out.

5. POWER lamp (red)

(1) This lamp is on when power is on.

(2) It blinks during an error condition.

6. STOP/RESET lamp (red)

(1) This lamp is lit and the P.EMP signal is output either when the STOP/RESET switch is pushed or when paper is out.

(2) When paper is out, insert paper and press the STOP/RESET switch to turn this lamp off and to clear the PAPER EMPTY condition.

(3) When a PAPER EMPTY condition occurs, pushing the STOP/RESET switch clears the PAPER EMPTY condition enabling the printer to receive more data including a print command which is a last input data, and to print them out. After printing the line, it returns to the PAPER EMPTY condition. Cancellations of the PAPER EMPTY condition by the switch are valid up to the total line feed of 128/120 inch fed after the first PAPER EMPTY condition.

(4) Pushing the switch again turns the lamp off when it has been turned on by the switch.

[3] PAPER LOADING

1. Continuous forms

Figure 3-1

(1) Grasp the back of the printer cover and remove it by lifting upwards.

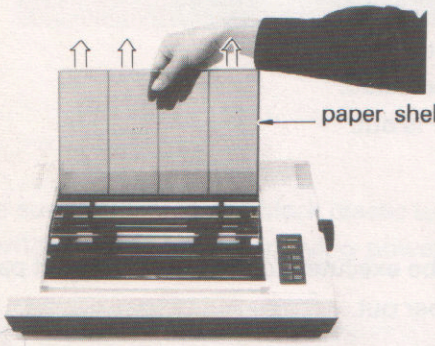


Figure 3-2

(2) Turn the paper shelf upright and pull it up to remove it.
Move the head adjustment lever all the way toward the front of the printer. Refer to " HEAD POSITION ADJUSTMENT"

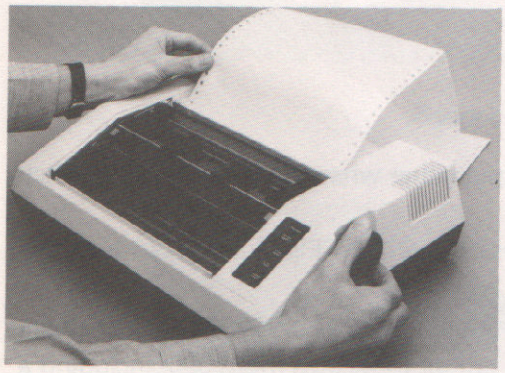


Figure 3-3

(3) Use both hands to insert the paper from the rear and then use the right hand to turn the paperfeed knob in a clockwise direction until it appears between the platen and the print head.

Note: If the paper does not appear by turning only the knob, use your hand to push the paper into the printer while turning the knob.

(4) Lift up the friction roller bar and open the tractor covers to the side.

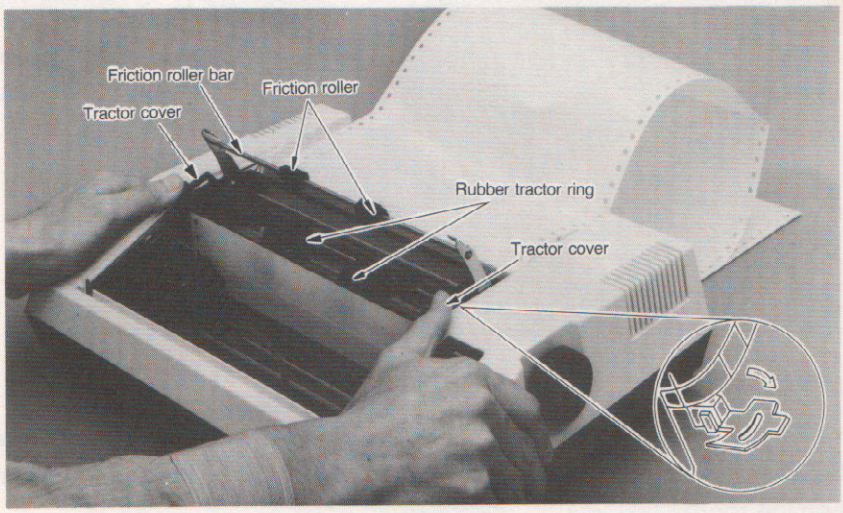


Figure 3-4

(5) With the holes along both sides of the paper matched up with the paper feed pins on the left and right tractors, close the tractor covers.
Lower the friction roller bar, positioning the friction rollers on the bar so that they rest directly on top of the two large rubber tractor rings.
Use the LINE FEED switch to perform line feeds in order to tighten the paper.
If the tactor spacing does not match the paper width, slide the tactors to the left or right as needed. Make sure that the paper is positioned so that the first and last print positions are on the paper.

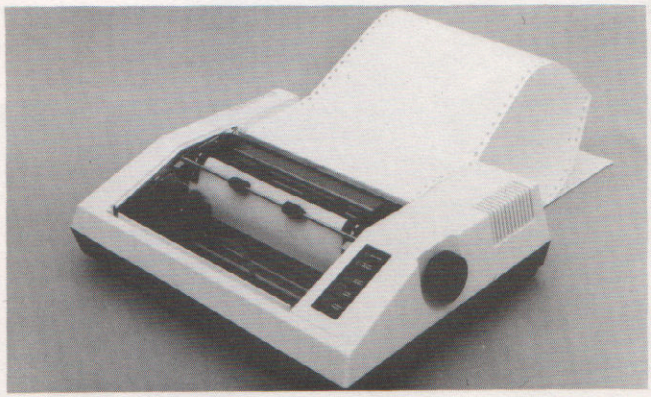


Figure 3-5

(6) Return the head adjustment lever to its original position. Replace the paper shelf and printer cover in that order.
Adjust the print position by pushing the LINE FEED switch.

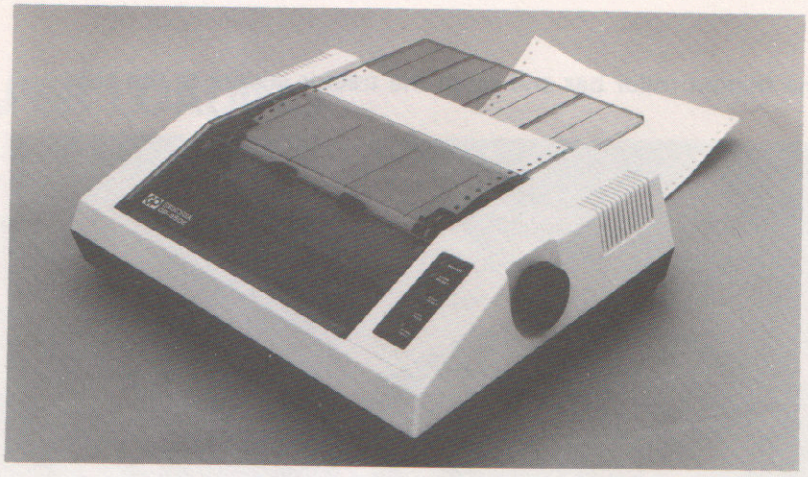


Figure 3-6

Note: After manually advancing paper by the paper feed knob, it is recommended that the LINE FEED switch be pushed at least once in order to avoid having abnormal double pass printing for the first line.

2. Single sheets of paper

Except for those involving the tractors, all of the operations are the same and follow the order of section [3]-1.

Note: 1. For proper friction feeding, be sure that the friction rollers are positioned directly on top of the rubber tractor rings and that these two sets of rollers properly grasp the paper.

2. The paper empty switch is located at a position about 1½" away from the metal side plate on the left.
The left edge of the single sheet of paper must cover the switch in order to avoid the PAPER EMPTY condition.

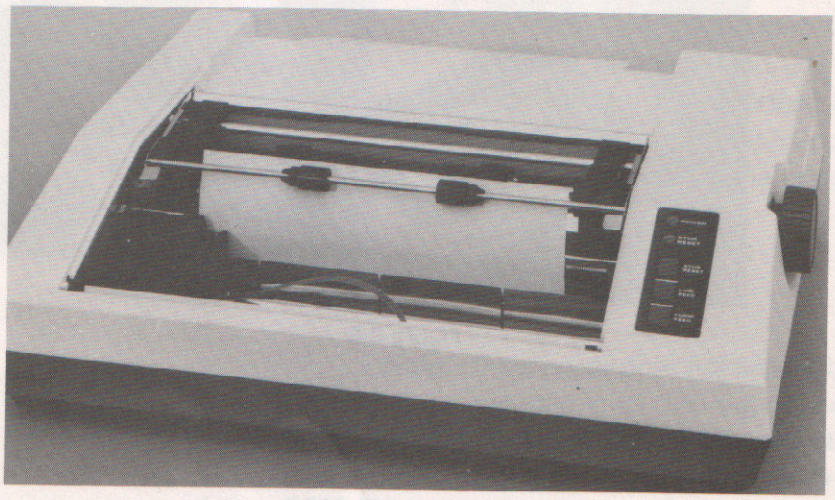


Figure 3-7

[4] RIBBON INSTALLATION/REMOVAL

1. Installation

a) Tighten the ribbon by turning the knob in the direction indicated by the arrow.

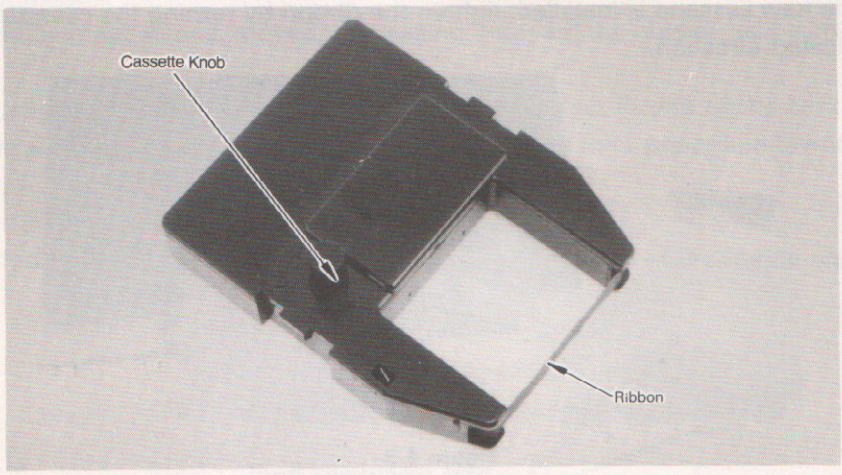


Figure 4-1

b) Gently move the head adjustment lever toward the front of the printer as far as it will go.

c) Slide the ribbon inbetween the print head and the platen. Gently press the left side of the cassette down until you hear a click.

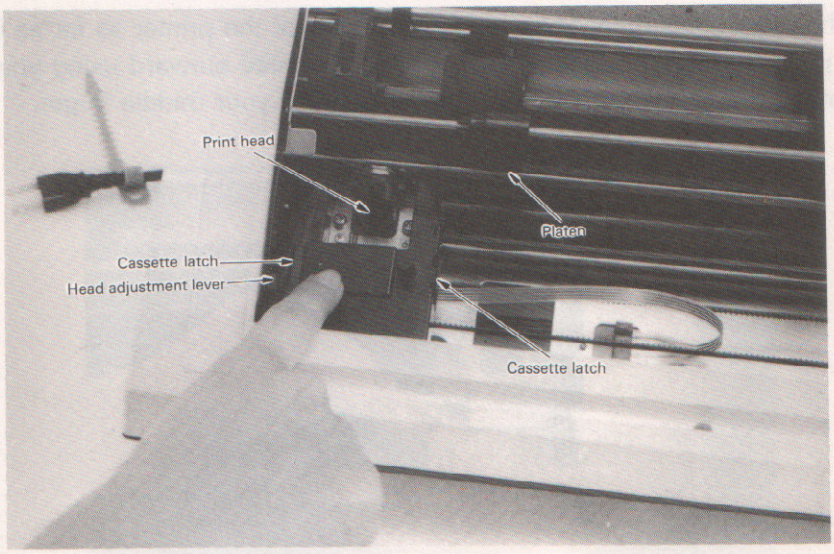


Figure 4-2

d) Then, while rotating the cassette knob in the direction indicated by the arrow, press the right side of the cassette.
Do not force the cassette down. Push it in gradually while turning the cassette knob in the indicated direction.
Once the new cassette is installed, tighten the ribbon by turning the cassette knob in the indicated direction.

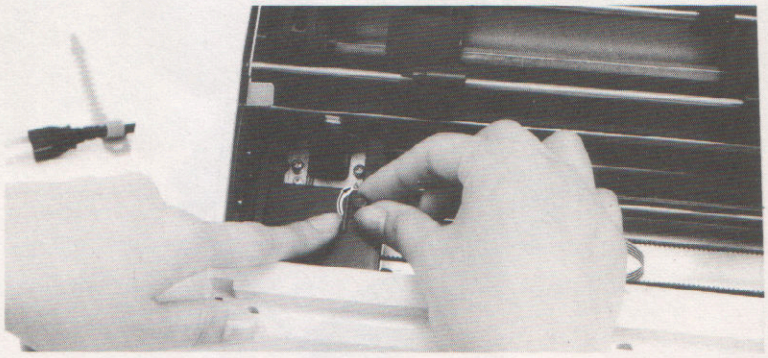


Figure 4-3

e) Set the head adjustment lever to its original position.

Note: Do not print without paper and/or ribbon.
The print head or platen will be damaged.

2. Removal

a) Move the head adjustment lever toward the front of the printer as far as it will go.
b) Gently push the ribbon cassette latch on the right side outward using your thumb, and remove the cassette by lifting it upwards using your middle finger.

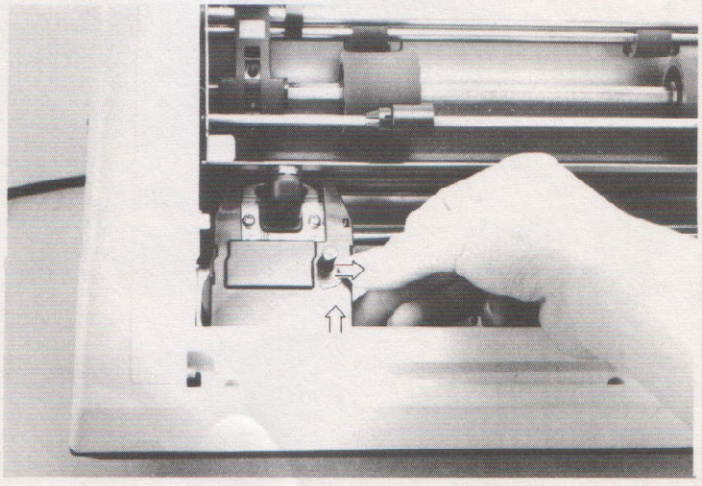


Figure 4-4

[5] HEAD POSITION ADJUSTMENT

The head adjustment lever is used to adjust for varying thicknesses of paper and varying printing conditions.
The head adjustment lever is moved by pressing it toward the outside as it is moved back and forth.
When adjusting, make sure that the foot of the lever is set in one of the click holes.
The head is adjusted by moving the lever toward (8) for thick paper and toward (1) for thin paper.
The printer is shipped with the lever foot set to position (3).
The lever foot should be set to (8) for insertion and removal of the ribbon and the paper.

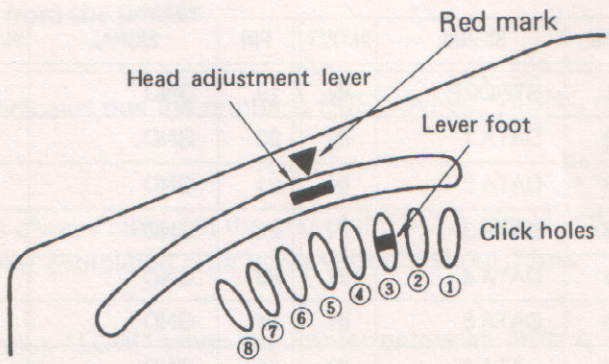
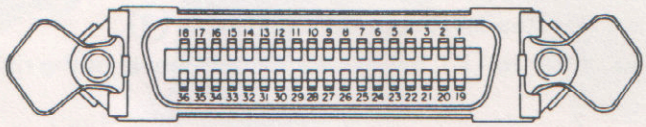


Figure 5-1 Internal left side view

[6] INTERFACING

1. **Connector on the cable side**
   DDK 36 pin (57-30360-D8)
2. **Connector on the printer side and its pinout chart**
   DDK 36 pin (57L-40360-270B)



PIN	SIGNAL	IN/OUT	PIN	SIGNAL	IN/OUT
1	$\overline{\text{STROBE}}$	IN	19	GND	
2	DATA 1	IN	20	GND	
3	DATA 2	IN	21	GND	
4	DATA 3	IN	22	GND	
5	DATA 4	IN	23	GND	
6	DATA 5	IN	24	GND	
7	DATA 6	IN	25	GND	
8	DATA 7	IN	26	GND	
9	DATA 8	IN	27	GND	
10	$\overline{\text{ACK}}$	OUT	28	GND	
11	BUSY	OUT	29	GND	
12	P. EMP	OUT	30	GND	
13	NC		31	$\overline{\text{INITIAL}}$	IN
14	GND		32	$\overline{\text{ERROR}}$	OUT
15	GND		33	GND	
16	GND		34	NC	
17	CHASSIS GND		35	NC	
18	NC		36	NC	

NC stands for no connection.

3. Explanation of the input/output signals

a) Input signals to the printer

- DATA1 ~ DATA8

  These form the 8 bit data signal.
  A given line is "HIGH" if the data bit is "1".

- $\overline{\text{STROBE}}$

  This signal is used to strobe the 8 bits of data into the printer. The data is read in when this line goes "LOW".

- $\overline{\text{INITIAL}}$

  This signal is used to set the printer to its initial state. This pin is normally "HIGH".
  Bringing it "LOW" stops the execution of the printer and setting it back to "HIGH" starts the execution of the clearing sequence that sets it to its initial condition.

b) Output signals from the printer

- BUSY

  This signal indicates that the printer is BUSY. When "HIGH", new data cannot be input.

- $\overline{\text{ACK}}$

  This signal is always output at the end of the BUSY signal and indicates that data input has been completed. The pulse width is about 7.5μs.

- $\overline{\text{ERROR}}$

  This signal goes "LOW" when the Printer enters an error condition.

- P. EMP (PAPER EMPTY)

  This signal goes "HIGH" either when the printer is out of paper or when the STOP/RESET switch is pushed. In thes case the printer stops processing data. In order to clear this condition, insert paper and push the STOP/RESET switch. Refer to the "STOP/RESET lamp" on page 5.

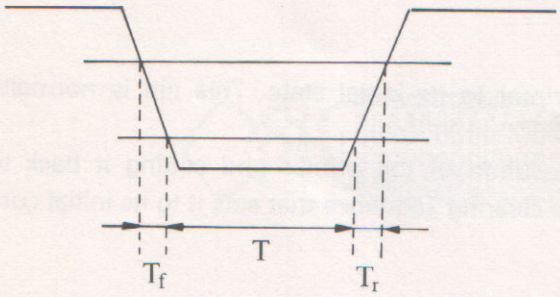
4. Electrical conditions

a) Signal levels

All input/output signals are TTL level

"HIGH" level +2.4~5.0V

"LOW" level +0.0~0.4V (at the input of the printer)

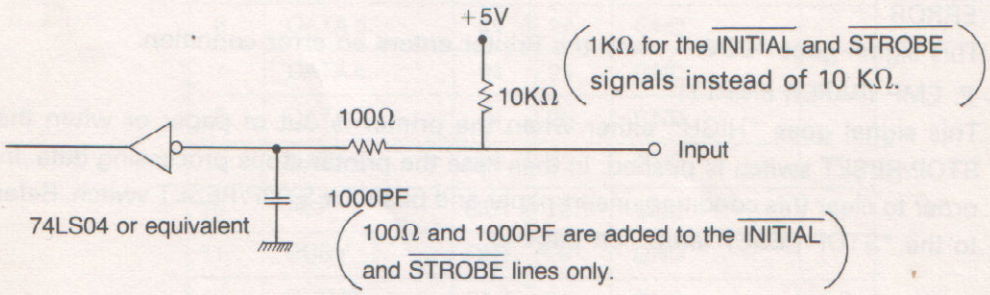


Tf, Tr = 100ns or less
T is the value as shown in the timing chart.

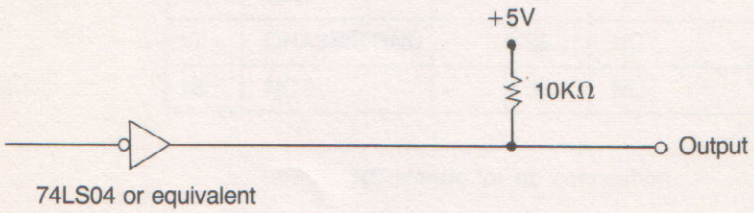
b) Input/output conditions

Except for the $\overline{\text{STROBE}}$ and $\overline{\text{INITIAL}}$ signals, all input/output signals are pulled up to +5V through a 10KΩ resistor.

- Input signals
  Input loading is a 74LS04 or equivalent.



- Output signals
  Outputs are through a 74LS04 or equivalent. Recommended loading is one TTL or LSTTL or the equivalent.



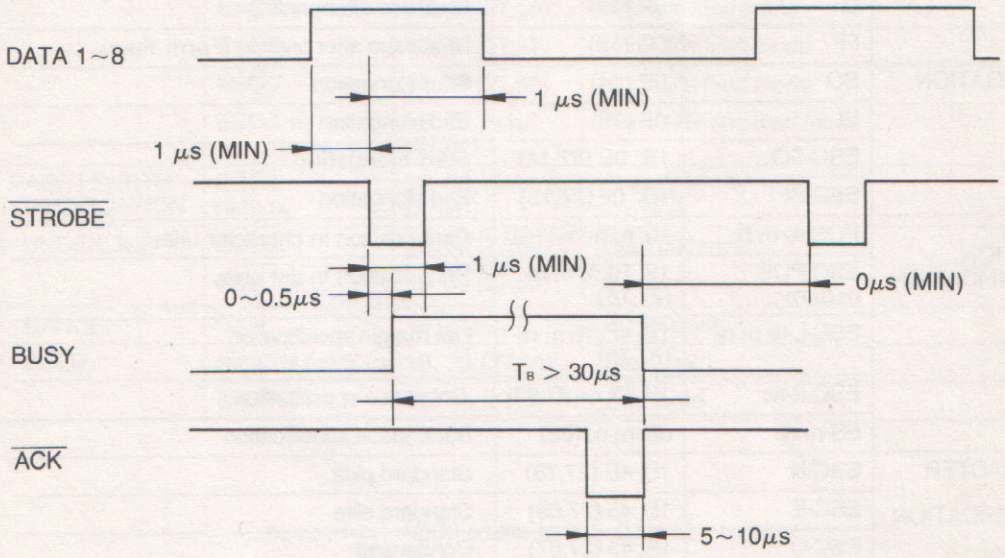
c) Signal cable length

The maximum length is 2 meters and the following signals should be run as twisted pairs with the GND lines, or alternated with the ground lines when a flat cable is used.

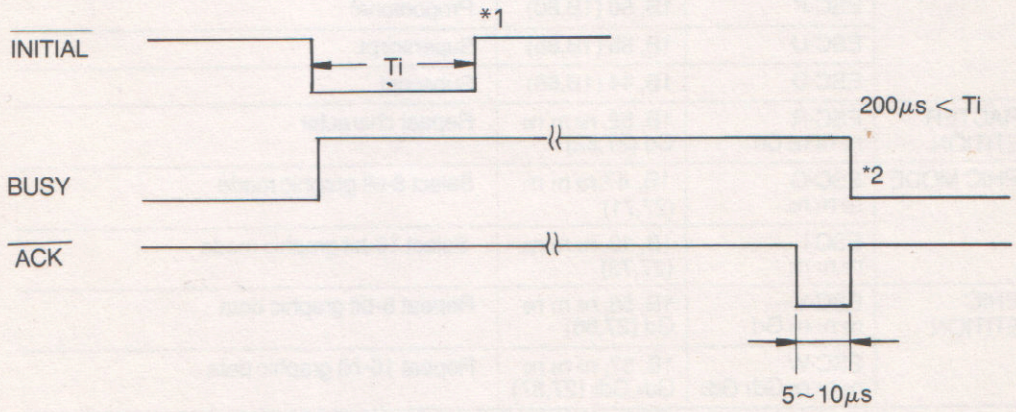
$\overline{\text{STROBE}}$, $\overline{\text{INITIAL}}$, BUSY, $\overline{\text{ACK}}$, $\overline{\text{ERROR}}$, P. EMP

5. Timing chart

a) Data input



b) INITIAL signal input



*1 While $\overline{\text{INITIAL}}$ is "LOW", the printer is held in a reset state. After it goes "HIGH" the initialization operation starts.

*2 BUSY goes "LOW" after the printer has finished the initialization operation.

[7] CONTROL CODE SUMMARY

FUNCTION	SYMBOL	HEX (DECIMAL)	EXPLANATION
1. PRINT COMMAND	CR	0D (13)	Printing
	LF	0A (10)	Line feed after printing
	FF	0C (12)	Next page after printing (Form feed)
2. ELONGATION	SO	0E (14)	Start elongation
	SI	0F (15)	End elongation
	ESC·SO	1B, 0E (27,14)	Start elongation
	ESC·SI	1B, 0F (27,15)	End elongation
3. PRINT POSITION SPECIFICATION	POS·n_2 n_1 n_0	10, n_2 n_1 n_0 (16)	Print position in character units
	ESC·POS· n_2 n_1 n_0	1B, 10, n_2 n_1 n_0 (27,16)	Print position in dot units
	ESC·L·n_2 n_1 n_0	1B, 4C, n_2 n_1 n_0 (27,76)	Left margin specification
	ESC·S·n_0	1B,53,n_0(27,83)	Dot space specification
	BS·n_1 n_0	08, n_1 n_0 (08)	Back space specification
4. CHARACTER SET SPECIFICATION	ESC·N	1B, 4E (27,78)	Standard pica
	ESC·E	1B, 45 (27,69)	Standard elite
	ESC·C	1B, 43 (27,67)	Condensed
	ESC·H	1B, 48 (27,72)	Correspondence pica
	ESC·Q	1B, 51 (27,81)	Correspondence elite
	ESC·B	1B, 42 (27,66)	Italic cursive
	ESC·P	1B, 50 (1B,80)	Proportional
	ESC·U	1B, 55 (1B,85)	Superscirpt
	ESC·D	1B, 44 (1B,68)	Subscript
5. CHARACTER REPETITION	ESC·R n_2 n_1 n_0 Cd	1B, 52, n_2 n_1 n_0 Cd (27,82)	Repeat character
6. GRAPHIC MODE	ESC·G n_2 n_1 n_0	1B, 47,n_2 n_1 n_0 (27,71)	Select 8-bit graphic mode
	ESC·I n_2 n_1 n_0	1B, 49, n_2 n_1 n_0 (27,73)	Select 16-bit graphic mode
7. GRAPHIC REPETITION	ESC·V· n_2 n_1 n_0 Gd	1B, 56, n_2 n_1 n_0 Gd (27,86)	Repeat 8-bit graphic data
	ESC·W· n_2 n_1 n_0 Gd_1 Gd_2	1B, 57, n_2 n_1 n_0 Gd_1 Gd_2 (27,87)	Repeat 16-bit graphic data

FUNCTION	SYMBOL	HEX (DECIMAL)	EXPLANATION
8. LINE FEED SPACING	ESC·6	1B, 36 (27,54)	1/6″ line feed mode
	ESC·8	1B, 38 (27,56)	1/8″ line feed mode
	ESC·9	1B, 39 (27,57)	2/15″ line feed mode
	ESC·7	1B, 37 (27,55)	1/12″ line feed mode
	ESC·T·n_1 n_0	1B, 54, n_1 n_0 (27,84)	n_1 n_0/120″ line feed mode
9. PAGE LENGTH SPECIFICATION	ESC·Z n_2 n_1 n_0	1B, 5A, n_2 n_1 n_0 (27,90)	Specify in 1/6″ units.
10. UNDERLINE	ESC·X	1B, 58 (27,88)	Start underline
	ESC·Y	1B, 59 (27,89)	End underline
11. CANCEL	CAN	18 (24)	Buffer clear
12. BOLD	ESC·#(ESC£orESC·Pt)	1B, 23 (27,35)	Start bold
	ESC·$(ESC· ¤)	1B, 24 (27,36)	End bold

n_3 n_2 n_1 n_0: ASCII codes for the digits of a number

Cd:Character data

Gd:Graphic data

[8] CONTROL CODES

1. Print commands

(1) [CR] (0D) Hex (13) Decimal

- Input of this code causes the data in the printer's buffer to be printed. The execution of a line feed after printing is determined by the setting of dip switch number 4. The printer is shipped with the switch in the OFF position which means that no line feed is executed. (Refer to DIP SWITCH SETTINGS for instructions on changing switches)
- If there is no data in the buffer, or if all of the data are spaces, the printhead does not move.
- For the case of no line feed, a 1/120″ linefeed is executed for both 2-pass print mode and 16-bit graphic mode, and a 1/60″ linefeed is executed for underline mode. The amount of paper fed will be compensated for on the next line feed.

(2) [LF] (0A) Hex (10) Decimal

- Input of this code causes the data in the printer's buffer to be printed and then a line feed and carriage return executed.
- If there is no data in the buffer, or if all of the data are spaces, a line feed alone is executed.

Note for [CR] and [LF]

: The line feed spacing is set by any of the following commands:
[ESC][6] , [ESC][7] , [ESC][8] , [ESC][9] or [ESC][T]

(3) [FF] (0C) Hex (12) Decimal

- Input of this code causes the data in the printer's buffer to be printed and a form feed executed.
- The page length is set by [ESC][Z] . When power is turned on, or when an $\overline{\text{INITIAL}}$ signal is input, the page length is set to 11 inches.

2. Elongation

(1) [SO] (0E) Hex (14) Decimal
[ESC][SO] (1B, 0E) Hex (27, 14) Decimal

- The characters that follow the [SO] or [ESC][SO] are printed in the double width format.
- This elongation is effective for any print mode.

(2) [SI] (0F) Hex (15) Decimal
[ESC][SI] (1B, 0F) Hex (27, 15) Decimal

- Elongation is cleared by these codes.

3. Print position specification

(1) POS | n_2 | n_1 | n_0 **(10) n_2 n_1 n_0 Hex**

(16) n_2 n_1 n_0 Decimal

- This is the command which specifies the print position in character units of the designated character mode. Input of this code causes printing to start at the character column n_2 n_1 n_0 away form the left margin position.
- n_2, n_1, n_0 are ASCII codes for a three-digit decimal number. In elongation mode, n_2, n_1, n_0, is still calculated as the number of standard character widths.
- When the specified position exceeds the last character column, the four bytes, POS | n_2 | n_1 | n_0 , are ignored.
- In the Proportional mode, the character width of Standard pica is used instead.

(2) ESC | POS | n_2 | n_1 | n_0 **(1B, 10) n_2 n_1 n_0 Hex**

(27, 16) n_2 n_1 n_0 Decimal

- This specifies the print position in dot units. Input of this code causes printing to start at the dot colum n_2 n_1 n_0 away from the left margin position.
- n_2 n_1 n_0 are ASCII codes for a three-digit decimal number.
- If the position specified exceeds the last dot column (960th dot column), the five bytes, ESC | POS | n_2 | n_1 | n_0 , are ignored.

(3) ESC | L | n_2 | n_1 | n_0 **(1B, 4C) n_2 n_1 n_0 Hex**

(27,76) n_2 n_1 n_0 Decimal

- This specifies the left margin in character units away from the home position. When power is turned on, or when an $\overline{\text{INITIAL}}$ signal is input, the left margin is set to n_2 n_1 n_0 = 000, that is, the home position.
  Input ESC | L | 0 | 0 | 0 into the printer to clear the left margin.
- When specifying a left margin after print data is already in the buffer, that particular left magin specification takes effect after printing the print data in the buffer. When there is no print data in the buffer, the left margin is set as soon as it is received.
- n_2, n_1, n_0 are ASCII codes for a three-digit decimal number.
- When specifying a left margin that exceeds the 936th dot column position, the five bytes of ESC | L | n_2 | n_1 | n_0 are ignored.

(4) ESC | S | n_0 **(1B, 53) n_0 Hex**

(27, 83) n_0 Decimal

- This specifies the dot space from the present dot column.
- n_0 is an ASCII code for a one digit decimal number
- If n_0 is an ASCII code other than 31H(1) to 39H(9), the three bytes of ESC | S | n_0 are ignored.

(5) BS | n_1 | n_0 **(08) n_1 n_0 Hex (08) n_1 n_0 Decimal**

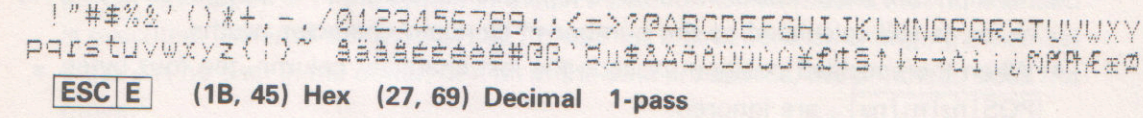
- This command specifies the back space in dot units.
- n_1, n_0 are ASCII codes for a two-digit number where the maximum number is 99.

4. Character set specification

(1) ESC N (1B, 4E) Hex (27, 78) Decimal 1-pass

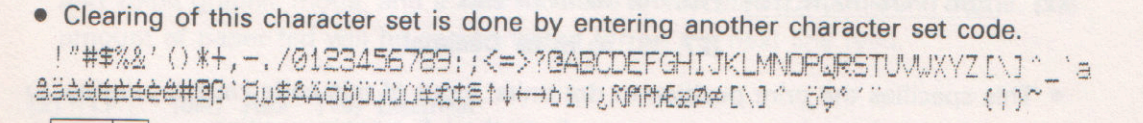
- Entering this code selects Standard pica character set printing at 10 characters per inch.

  When power is turned on or when the printer receives an INITIAL signal, this character set is selected.
- This character set is cleared by entering another character set code.



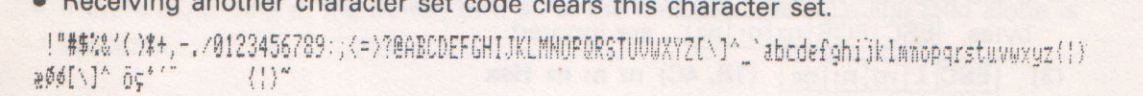
ESC E (1B, 45) Hex (27, 69) Decimal 1-pass

- Input of this code selects Standard elite character set printing at 12 characters per inch.
- Clearing of this character set is done by entering another character set code.



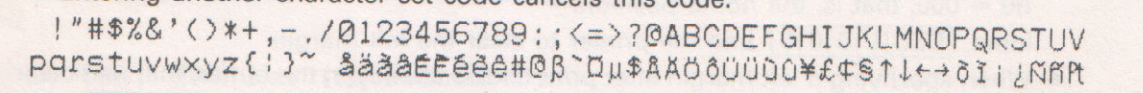
ESC C (1B, 43) Hex (27, 67) Decimal 1-pass

- This code specifies Condensed character set printing at 17 characters per inch.
- Receiving another character set code clears this character set.



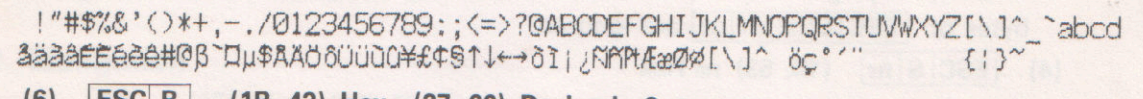
(4) ESC H (1B, 48) Hex (27, 72) Decimal 2-pass

- Input of this code selects Correspondence pica character set printing at 10 characters per inch.
- Entering another character set code cancels this code.



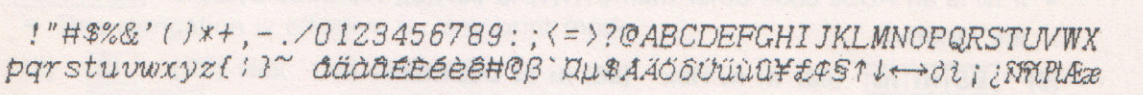
(5) ESC Q (1B, 51) Hex (27, 81) Decimal 2-pass

- Correspondence elite character printing at 12 characters per inch is selected by inputting this code.
- This selection is cleared with another character set code.



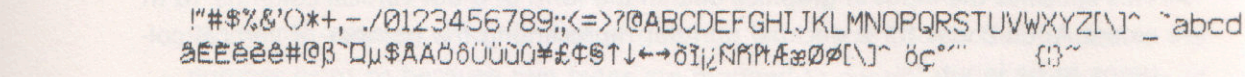
(6) ESC B (1B, 42) Hex (27, 66) Decimal 2-pass

- Entering this code selects Italic cursive character set printing at 10 characters per inch.
- This is cleared by selecting another character set code.



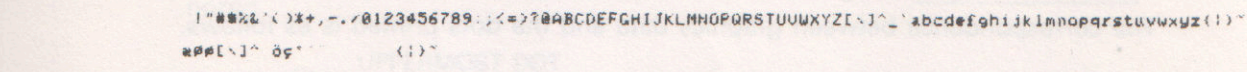
(7) ESC P (1B, 50) Hex (27, 80) Decimal 2-pass

- Input of this code specifies Proportional character set printing.
- When specifying the print position by character column in this character set, 10 characters per inch is assumed to calculate the position.
- Input of another character set code clears this character set.



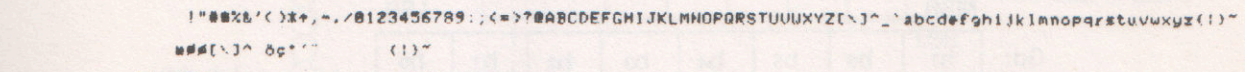
(8) ESC U (1B, 55) Hex (27, 85) Decimal 2-pass

- Superscript character set printing is selected by entering this code.
- Receiving another character set code clears this mode.



(9) ESC D (1B, 44) Hex (27, 68) Decimal 2-pass

- Input of this code selects Subscript character set.
- Another character set code clears this mode.



5. Character repetition

ESC R n2 n1 n0 Cd

(1B, 52) n2 n1 n0 Cd Hex

(27, 82) n2 n1 n0 Cd Decimal

- This code tells the printer to repeat the single character Cd (20 ≦ Cd ≦ 7F, A0 ≦ Cd ≦ DF) a specified number of times (n2 n1 n0).
- n2 n1 n0 are ASCII codes for a three-digit decimal number. If they are not a three-digit decimal number, the first five-bytes are ignored.
- The six-byte code, ESC R n2 n1 n0 Cd , is ignored when Cd is not a character code. When n2 n1 n0 = 0, the five-bytes, ESC R n2 n1 n0, are ignored and Cd is printed once.

6. Graphic mode

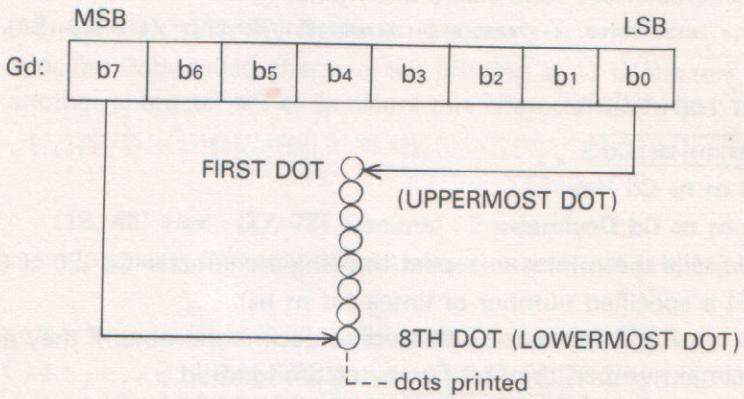
(1) ESC | G | n_2 | n_1 | n_0 | Gd_1 .... Gd_n **1 pass**

(1B, 47) n_2 n_1 n_0 Gd_1....Gd_n Hex

(27, 71) n_2 n_1 n_0 Gd_1.... Gd_n Decimal

- This specifies the input of graphics data in the form of 8-dot vertical columns. n_2 n_1 n_0 are ASCII codes for a decimal number representing the number of vertical columns to be input.
  Gd_1...Gd_n are the same number of graphics data bytes as represented by n_2 n_1 n_0
- If n_2 n_1 n_0 is 0 or not a decimal number, the five byte command string
  ESC | G | n_2 | n_1 | n_0 is ignored.

The correspondence between graphics data and the dots printed is as follows.

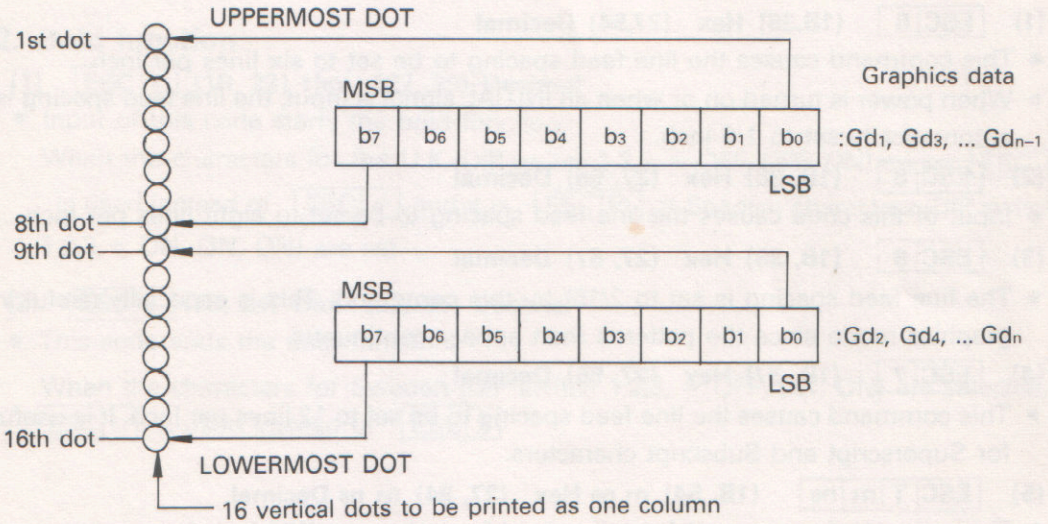


(2) ESC | l | n_2 | n_1 | n_0 | Gd_1 ····· Gd_n **2-pass**

(1B, 49) n_2 n_1 n_0 Gd_1 ····· Gd_n Hex

(27, 73) n_2 n_1 n_0 Gd_1 ····· Gd_n Decimal

- ESC | l | specifies the input of graphics data in the form of 16-dot vertical columns. n_2 n_1 n_0 are ASCII codes for a three-digit decimal number representing the number of vertical columns. The number of graphics data bytes (Gd_1,... Gd_n) is double the number n_2 n_1 n_0 because two bytes are required to specify the 16 vertical dots of one column.
- If n_2 n_1 n_0 is 0 or not a deicmal number, the five bytes ESC | l | n_2 | n_1 | n_0 | are ignored.



7. Graphic repetition

(1) ESC | V | n_2 | n_1 | n_0 | Gd_0 | **1 pass**

(1B, 56) n_2 n_1 n_0 Gd_0 Hex

(27, 86) n_2 n_1 n_0 Gd_0 Decimal

- This is to specify the repeated printing of an 8-dot column. Gd_0 is the data to be repeated and n_2 n_1 n_0 are the number of repetitions.
- n_2 n_1 n_0 are ASCII codes for a thee-digit decimal number. If n_2 n_1 n_0 = 0, or not a decimal number, all six bytes ESC | V | n_2 | n_1 | n_0 | Gd_0 | are ignored.
- The correspondence between the graphics data Gd_0 and the printed dots is identical to that explained in the command ESC | G | .

(2) ESC W n_2 n_1 n_0 Gd_1 Gd_0 **2-pass**

(1B, 57) n_2 n_1 n_0 Gd_1 Gd_0 Hex

(27, 87) n_2 n_1 n_0 Gd_1 Gd_0 Decimal

- This command is used to specify the repeated printing of a 16-dot column, n_2 n_1 n_0 are ASCII codes for a three-digit decimal number representing the number of repetitions. Gd_1 and Gd_0 are the data to be repeated.
- If n_2 n_1 n_0 is 0 or not a decimal number, all seven bytes are ignored.
- The correspondence between the graphics data Gd_1 Gd_0 and the dots printed is the same as that for ESC I

8. Line feed spacing

(1) ESC 6 **(1B,36) Hex (27,54) Decimal**

- This command causes the line feed spacing to be set to six lines per inch.
- When power is turned on or when an INITIAL signal is input, the line feed spacing is automatically set to 1/6 inch.

(2) ESC 8 **(1B, 38) Hex (27, 56) Decimal**

- Input of this code causes the line feed spacing to be set to eight lines per inch.

(3) ESC 9 **(1B, 39) Hex (27, 57) Decimal**

- The line feed spacing is set to 2/15″ by this command. This is especially useful in graphics mode since the patterns then appear continuous.

(4) ESC 7 **(1B, 37) Hex (27, 55) Decimal**

- This command causes the line feed spacing to be set to 12 lines per inch. It is useful for Superscript and Subscript characters.

(5) ESC T n_1 n_0 **(1B, 54) n_1 n_0 Hex (27, 84) n_1 n_0 Decimal**

- The amount of movement for a line feed is set to n_1 n_0/120 inch increments.
- n_1 n_0 are ASCII codes for a two-digit decimal number.
- After printing characters in 2-pass mode for a line feed specification of n_1 n_0 = 0, a 1/120 of an inch paper advance is performed. 1/60 of an inch of paper is advanced when printing in underline mode even when n_2 n_1 $\leqq$ 1 has been specified.

9. Page length specification

ESC Z n_2 n_1 n_0 **(1B, 5A) n_2 n_1 n_0 Hex (27, 90) n_2 n_1 n_0 Decimal**

- This command is used to set the length of a page to the number of lines as specified by n_2 n_1 n_0.

  The spacing for one line is 1/6 inch. The top of page one is redefined to be the paper position when this code is input.
- n_2 n_1 n_0 are ASCII codes for a three-digit decimal number where $0 < n_2\ n_1\ n_0 \leqq 198$. If n_2 n_1 $n_0 \geqq 199$ or n_2 n_1 n_0 = 0, these five bytes are ignored.

10. Underline

(1) ESC X (1B, 58) Hex (27, 88) Decimal

- Input of this code starts underlining from the current position. An underline will be printed after printing the input data.
- Up to 30 underlines in a line can be specified.

(2) ESC Y (1B, 59) Hex (27, 89) Decimal

- This command cancels the underline mode.

11. Cancel

CAN (18) Hex (24) Decimal

- Data in the buffer is cleared by this code. However, the print mode is not cleared.

12. Bold function

(1) ESC # (1B, 23) Hex (27, 35) Decimal

- Input of this code starts the bold function.

  When the characters for the U.K. (DIP switch 1,2,3, = OFF, OFF, ON) are set, ESC £ is used instead of ESC # and it is ESC Pt, if Spanish characters (DIP switch 1,2,3 = ON, ON, ON) are set.

(2) ESC $ (1B, 24) Hex (27, 36) Decimal

- This code ends the bold function.

  When the characters for Sweden (DIP switch 1,2,3, = OFF, ON, ON) are selected, ESC ¤ is used instead of ESC $

[9] ERROR CONDITIONS

- When the printer enters an error condition, the POWER lamp starts blinking and an ERROR signal is output to the computer.
- An error condition is cleared by either turning power off and then back on again, or by the input of an $\overline{\text{INITIAL}}$ signal.
- A printer error condition arises only when abnormal sensor timing is detected.

[10] SELF TEST PRINTING

1. If there is paper in the printer and the LINE FEED switch is held down as the power is turned on, the printer will go through its normal initialization routines and then proceed to start printing all the Standard pica characters repeatedly. If there is no paper in the printer, the self test printing does not start.
   Keep pressing the LINE FEED switch until the self test printing actually starts.
2. Holding down the FORM FEED switch instead of the LINE FEED switch will start continuous printing of all the character sets stored in the printer.
3. Self test printing is stopped either by turning the POWER switch off or by pushing the STOP/RESET switch. When the STOP/RESET switch is used, the printer enters the STOP condition.

[11] AUTOMATIC PRINTING FUNCTION

If text data is input to the printer that exceeds the length of one line, printing of text starts even though a print command has not been received and the portion of the text that exceeds the line length is printed on the next line.
The print mode is not changed.
In the Condensed character mode, automatic printing starts when the text data exceeding 136th character column is input.
In the other character modes, inputting data that exceeds the 960th dot column starts automatic printing.

[12] DIP SWITCH SETTINGS

The DIP switch is located on the printed circiut board. Bring the printer to the store where you made the purchase for changing the DIP switch settings.

DIP switch No.	FUNCTION	ON	OFF	SETTING AS SHIPPED
4	CR code	Carriage return and linefeed	Carriage return only	OFF
3 2 1	Language selection	Refer to the table below.		OFF OFF OFF

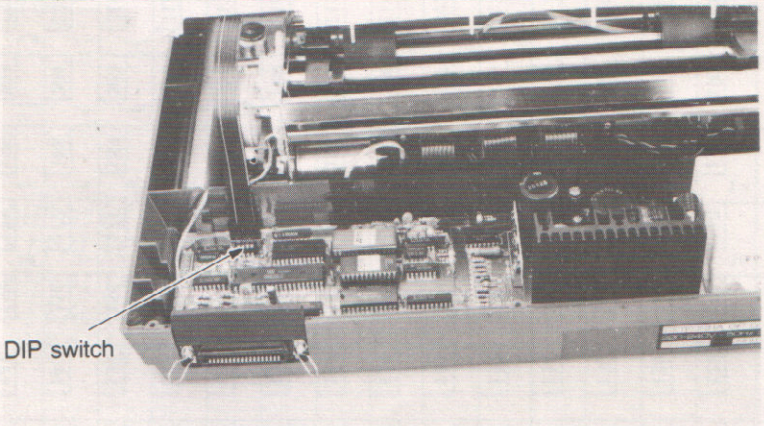


Figure 12-1

Language selection with DIP switch 1, 2 and 3.

DECIMAL		35	36	64	91	92	93	94	96	123	124	125	126		DIP SWITCH		
HEX		23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E		No.1	No.2	No.3
COUNTRY	U.S.A	#	$	@	[	\	]	^	`	{	|	}	~		OFF	OFF	OFF
	U.K.	£	$	@	[	\	]	^	`	{	|	}	~		OFF	OFF	ON
	GERMANY	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß		OFF	ON	OFF
	SWEDEN	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü		OFF	ON	ON
	FRANCE	#	$	à	°	Ç	§	^	`	é	ù	è	¨		ON	OFF	OFF
	DENMARK	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~		ON	OFF	ON
	ITALY	#	$	@	°	\	é	^	`	à	ò	è	ì		ON	ON	OFF
	SPAIN	Pt	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~		ON	ON	ON

[13] CODE TABLE

Control codes are enclosed with bold squares, while the other characters are print data in the range of 20_{HEX} to $7F_{HEX}$ and $A0_{HEX}$ to DF_{HEX}. Print data folowing the ESC code are treated as control codes.

Example: Capital letter 'L': 4C in HEXADECIMAL shown as (4C) H
76 in DECIMAL shown as (76)10

Upper Bit / Lower Bit	Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Hex.	Binary	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000		POS 16	SP 32	0 48	@ 64	P 80	` 96	p 112	128	144	160	176	192	208	224	240
1	0001	1	17	! 33	1 49	A 65	Q 81	a 97	q 113	129	145	161	177	193	209	225	241
2	0010	2	18	" 34	2 50	B 66	R 82	b 98	r 114	130	146	162	178	194	210	226	242
3	0011	3	19	# 35	3 51	C 67	S 83	c 99	s 115	131	147	163	179	195	211	227	243
4	0100	4	20	$ 36	4 52	D 68	T 84	d 100	t 116	132	148	161	180	196	212	228	244
5	0101	5	21	% 37	5 53	E 69	U 85	e 101	u 117	133	149	165	181	197	SP 213	229	245
6	0110	6	22	& 38	6 54	F 70	V 86	f 102	v 118	134	150	166	182	198	SP 214	230	246
7	0111	7	23	' 39	7 55	G 71	W 87	g 103	w 119	135	151	167	183	199	SP 215	231	247
8	1000	BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	136	152	168	184	200	SP 216	232	248
9	1001	9	25	) 41	9 57	I 73	Y 89	i 105	y 121	137	153	169	185	201	SP 217	233	249
A	1010	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	138	154	170	186	202	SP 218	234	250
B	1011	11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	139	155	171	187	203	{ 219	235	251
C	1100	FF 12	28	, 44	< 60	L 76	\ 92	l 108	| 124	140	156	172	188	204	\ 220	236	252
D	1101	CR 13	29	- 45	= 61	M 77	] 93	m 109	} 125	141	157	173	189	205	} 221	237	253
E	1110	SO 14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	142	158	174	190	206	~ 222	238	254
F	1111	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	SP 127	143	159	175	191	SP 207	SP 223	239	255

Note: Circled characters are selected by the DIP switch.

[14] PRINT EXAMPLES

1. Character sets

```
10 LPRINT CHR$(27);"N";:GOSUB 100' STANDARD PICA
20 LPRINT CHR$(27);"H";:GOSUB 100' CORRESPONDENCE PICA
30 LPRINT CHR$(27);"U";:GOSUB 100" SUPERSCRIPT
40 END
100 LPRINT "ABD 111 HHIHH"
110 RETURN
```

```
ABD 111 HHIHH
ABD 111 HHIHH
ABD 111 HHIHH
```

2. Elongation

```
10 LPRINT CHR$(27);"B";
20 LPRINT "ITALIC CURSIVE"
30 LPRINT CHR$(14);'START ELONGATION
40 LPRINT "ITALIC CURSIVE ELONGATED"
50 LPRINT CHR$(15)'END ELONGATION
60 END
```

```
ITALIC CURSIVE
ITALIC CURSIVE ELONGATED
```

3. Print position

```
10 LPRINT CHR$(16);"009";'CHARACTER COLUMN SPEC
20 LPRINT "10TH CHARACTER COLUMN"
30 LPRINT CHR$(27);CHR$(16);"500";'DOT COLUMN SPEC
40 LPRINT "501TH DOT COLUMN"
50 END
```

```
        10TH CHARACTER COLUMN
                                        501TH DOT COLUMN
```

4. Left margin

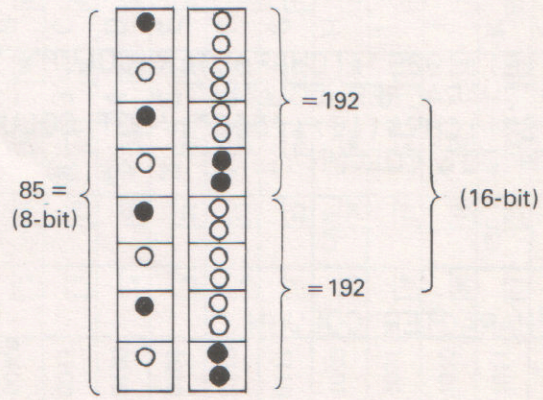
```
10 LPRINT CHR$(27);"L019";'LEFT MARGIN SPEC.
20 LPRINT "EVERYONE ADMITS"
30 LPRINT "HARRY IS
40 LPRINT "HANDSOME."
50 LPRINT CHR$(27);"L000"'RESET LEFT MARGIN
60 END
```

```
                    EVERYONE ADMITS
                    HARRY IS
                    HANDSOME
```

5. Repetitions

```
10 LPRINT CHR$(27);"R050A"'CHARACTER REPETITION
20 LPRINT:LPRINT
30 LPRINT CHR$(27);"V020";CHR$(85);'8-BIT REPITITION
40 LPRINT CHR$(27);"W020";CHR$(192);CHR$(192)
50 LPRINT '16-BIT REPITITION
60 END
```

```
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
```



6. 8-bit graphics

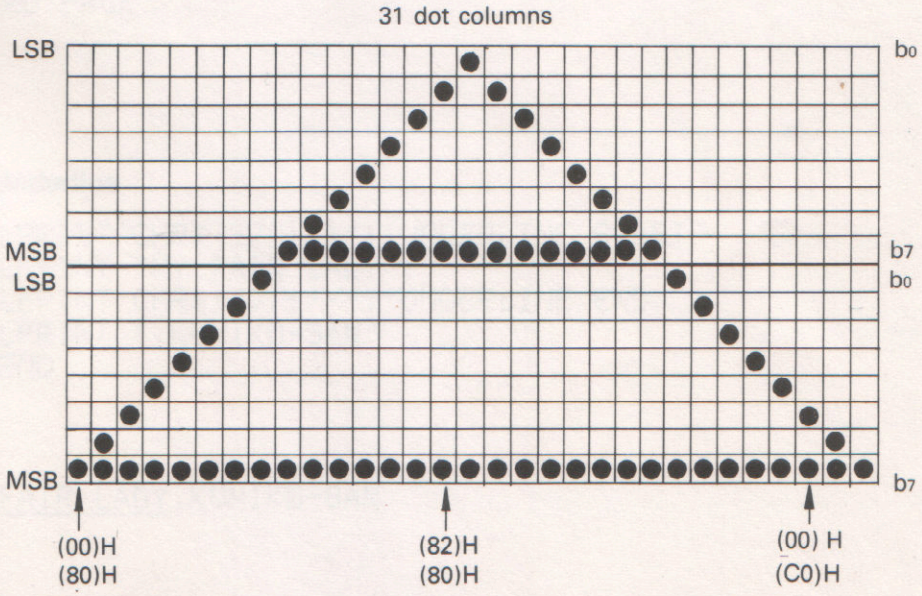
```
10 LPRINT CHR$(27);"G015";
15 RESTORE 70
20 FOR I=1 TO 15
30 READ A
40 LPRINT CHR$(A);
50 NEXT I
60 LPRINT
70 DATA 128,192,160,144,136,132,130,129,130
80 DATA 132.136,144,160,192,128
90 END
```

△

7. 16-bit graphics

```
10 LPRINT CHR$(27);"I031";
20 RESTORE 70
30 FOR I=1 TO 62
40 READ D$:B=VAL("&H"+D$):LPRINT CHR$(B);
50 NEXT
60 LPRINT
70 DATA 00,80,00,C0,00,A0,00,90,00,88,00,84,00,82,00,81
80 DATA 80,80,C0,80,40,80,90,80,88,80,84,80,82,80,81,80
90 DATA 82,80,84,80,88,80,90,80,A0,80,C0,80,80,80,00,81
100 DATA 00,82,00,84,00,88,00,90,00,A0,00,C0,00,80
110 END
```

△



8. Line feed spacing

```
10 LPRINT CHR$(27);"6";:GOSUB 100'FOR TEXT
20 LPRINT CHR$(27);"9";:GOSUB 100'FOR GRAPHICS
30 LPRINT CHR$(27);"U";'SUPERSCRIPT
40 LPRINT CHR$(27);"7";:GOSUB 100'FOR MICRO FONT
50 END
100 LPRINT "HHHHHHHHHH"
110 LPRINT "   HHH":LPRINT:LPRINT
120 RETURN
```

```
HHHHHHHHHH
   HHH


HHHHHHHHHH
   HHH


HHHHHHHHHH
   HHH
```

9. Page length

```
10 LPRINT CHR$(27);"Z010";'10 LINES A PAGE
20 LPRINT "FIRST PAGE":LPRINT
30 LPRINT "PRINT WHATEVER YOU WANT !"
40 LPRINT CHR$(12);'FF CODE
50 LPRINT "SECOND PAGE"
60 LPRINT CHR$(12);'FF CODE
70 LPRINT "THIRD PAGE"
80 END
```

```
FIRST PAGE

PRINT WHATEVER YOU WANT !




SECOND PAGE




THIRD PAGE
```

10. Underline

```
10 LPRINT CHR$(27);"X";'UNDERLINE START
20 LPRINT "MY FAIR LADY";
30 LPRINT CHR$(27);"Y";'UNDERLINE END
40 LPRINT ",KUMIKO-SAN"
50 END
```

```
MY FAIR LADY,KUMIKO-SAN
```

[15] TROUBLESHOOTING

Use the table below to diagnose any problems that may occur. If you cannot solve the problem, try to decide what part of your system is not working properly and consult your dealer.

PROBLEM	CAUSE AND REMEDY
The printer does not print. The POWER lamp does not light.	1) Power is not getting to the printer. • Check the power cord and power switch. 2) The fuse may be blown. • Replace it with exactly the same type of fuse. Unplug the power cord before replacement.
The printer does not print. The POWER lamp is lit.	1) The connection to the computer is not correct. • Check to make sure that the cable connecting the printer and computer is correctly connected. 2) The ribbon cassette is not properly installed. • Properly install it.
The printer is operating properly, but the paper is not feeding through properly.	1) The paper is jammed in the printer. • Remove the paper and reinsert it properly.
The print is light or smeared.	1) The printhead position is not correct. • Move the head adjustment lever to match the paper being used. 2) The ribbon cassette is not properly installed. • Properly install the cassette. 3) There is no ink in the inker. • Replace the old inker with a new one. 4) The ink ribbon is old or is worn out. • Replace the old ribbon cassette with a new one.
The POWER lamp is blinking	1) An error condition has occurred due to the detection of abnormal timing in a sensor. • Turn power off and then back on again or input the $\overline{\text{INITIAL}}$ signal.

[16] CARING FOR YOUR PRINTER

- Wait at least two seconds after turning power off before turning it back on again. The initialization process may not be performed correctly if this is not done.
- The printer should not be used in high humidity, direct sunlight or dusty conditions.
- The operating temperature range is 5°C~40°C. Rapid temperature changes should be avoided.

  Be sure that power is turned off to both the printer and computer before connecting or disconnecting the signal cable.
- Regardless of whether the power is ON or OFF, do not try to move or apply undue force to the printhead. Also, do not touch any of the moving parts of the printer while it is in oeration.
- Do not operate the printer without the ribbon cassette and paper properly installed. Failure to do so may cause damage to the printhead and/or platen.
- Set the connector lock levers in place when attaching the input signal cable.
- Normal character pattern dot densities are the most desirable. Continuous printing of very high density patterns may affect the life of the printhead.
- As a general rule, the upper case of the printer shuld not be removed. If it must be removed (for example to set the dip swithces), be sure to unplug the power cord from the outlet before doing so.

SEIKOSHA reserves the right to change the contents as stated herein at any time and without notice. Although every effort has been made to insure that the contents as stated herein are complete and without error, **SEIKOSHA** cannot be responsible for any damage that may occur should this not be the case.

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